

REMARKS

Claims 27-37 and 42-55 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 27-40 and 49-54 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yauchi et al. (U.S. Pat. No. 5,500,657) in view of Girones et al. (U.S. Pat. No. 6,238,112). This rejection is respectfully traversed.

Independent claim 27 calls for, among other elements:

the ejection failure detecting unit to include a judging unit which judges a cause of the ejection failure in the case where it is determined that there is the ejection failure of the droplets in the droplet ejection heads based on the vibration pattern of the residual vibration of the diaphragm;

the vibration pattern of the residual vibration of the diaphragm to include a cycle of the residual vibration; and

the judging unit to judge that:

an air bubble has intruded into the cavity in the case where the cycle of the residual vibration of the diaphragm is shorter than a predetermined range of cycle;

the liquid in the vicinity of the nozzle has thickened due to drying in the case where the cycle of the residual vibration of the diaphragm is longer than a predetermined threshold; and

paper dust is adhering in the vicinity of the outlet of the nozzle in the case where the cycle of the residual vibration of the diaphragm is longer than the predetermined range of cycle and shorter than the predetermined threshold.

Applicant respectfully submits that none of the cited references (Yauchi et al., Girones et al. nor Isayama) discloses or suggests the feature of the amended claim 27. In contrast, Yauchi et al. discloses an air-bubble detection apparatus 7 which detects the presence or absence of the occurrence of air bubbles in an ink passage 3 by detecting if a voltage, which develops across an electrostrictive vibrator 5 by mechanical strain as a result of the ink in the ink passage of an ink jet recording head being moved, exceeds an excess voltage above a drive voltage. This technique is completely different from that of the claimed invention wherein the presence or absence of air-bubbles and the like are detected by monitoring the vibration pattern of the detected residual vibration of a diaphragm. Further, Yauchi et al. can only detect the presence or absence of the occurrence of air bubbles.

Also in contrast to the claimed invention, although Girones et al. discloses thickening of the liquid in the vicinity of the nozzle due to drying and adhesion of paper dust in the vicinity of an outlet of the nozzle, the same recovery processing is taken for these causes. Further, Girones et al. does not disclose detecting intrusion of an air bubble into the cavity.

Isayama is completely different from the claimed invention.

In view of the foregoing, reconsideration and withdrawal of the rejection of claim 27 is respectfully requested.

The remaining rejected claims depend from claim 27 and should be in condition for allowance for at least the same reasons as set forth above.

Claim 41 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Yauchi et al. (U.S. Pat. No. 5,500,657) in view of Girones et al. (U.S. Pat. No. 6,238,112) as applied to claim 40, and further in view of Isayama (U.S. Pat. No. 4,034,380). This rejection is respectfully traversed. Notwithstanding, claim 41 is cancelled. Accordingly, this rejection is moot.

NEW CLAIM

New claim 55 is added. Among other elements, claim 55 recites a recovery unit which carries out recovery processing for the droplet ejection heads which is one of different discrete recovery processings respectively corresponding to the causes of the ejection failure to thereby eliminate the cause of the ejection failure, wherein the one recovery processing is selected according to the cause of the ejection failure detected by the ejection failure detecting unit. Applicant respectfully submits that the references of record fail to teach at least this aspect of claim 55 and therefore claim 55 should be in condition for allowance.

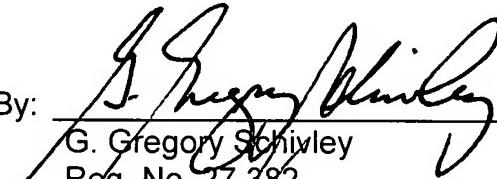
CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office

Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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